CP&L

**Carolina Power & Light Company**
Harris Nuclear Plant
PO Box 165
New Hill NC 27562

AUG 1 8 1997

U.S. Nuclear Regulatory Commission
ATTN: NRC Document Control Desk
Washington, DC 20555

Serial: HNP-97-159
10CFR50.73

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400
LICENSE NO. NPF-63
LICENSEE EVENT REPORT 97-019-00

Sir or Madam:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed Licensee Event Report is submitted. This report describes a Turbine Trip/Reactor Trip caused by a loss of generator excitation, followed by an automatic actuation of the Auxiliary Feedwater System.

Sincerely,

J. W. Donahue
Director of Site Operations
Harris Plant

MV

Enclosure

IE22

c: Mr. J. B. Brady (HNP Senior NRC Resident)
Mr. L. A. Reyes (NRC Regional Administrator, Region II)
Mr. V. L. Rooney (NRC - NRR Project Manager)

# CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9708250133 DOC.DATE: 97/08/18 NOTARIZED: NO DOCKET #
FACIL:50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina 05000400
AUTH.NAME AUTHOR AFFILIATION
VERRILLI,M. Carolina Power & Light Co.
DONAHUE,J.W. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 97-019-00:on 970720,turbine trip/reactor trip occurred. Caused by three phase fault collapsed excitation field in main generator,resulting in generator lockout.Exciter rotor assembly replaced.W/970818 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 3
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:Application for permit renewal filed. 05000400

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| | PD2-1 PD | 1 | 1 | ROONEY,V | 1 | 1 |
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| | AEOD/SPD/RRAB | 1 | 1 | FILE CENTER | 1 | 1 |
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| EXTERNAL: | L ST LOBBY WARD | 1 | 1 | LITCO BRYCE,J H | 1 | 1 |
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NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

1109

# LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| Harris Nuclear Plant Unit-1 | 50-400 | 1 OF 2 |

TITLE (4)

Turbine Trip/Reactor Trip due to failure of generator exciter.

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| 7 | 20 | 97 | 97 | -- 019 -- | 00 | 8 | 18 | 97 | FACILITY NAME | DOCKET NUMBER 05000 |

| OPERATING MODE (9) | 1 |
|---|---|
| POWER LEVEL (10) | 100% |

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

| | | | | | |
|---|---|---|---|---|---|
| | 20.2201(b) | | 20.2203(a)(2)(v) | | 50.73(a)(2)(i) | | 50.73(a)(2)(viii) |
| | 20.2203(a)(1) | | 20.2203(a)(3)(i) | | 50.73(a)(2)(ii) | | 50.73(a)(2)(x) |
| | 20.2203(a)(2)(i) | | 20.2203(a)(3)(ii) | | 50.73(a)(2)(iii) | | 73.71 |
| | 20.2203(a)(2)(ii) | | 20.2203(a)(4) | X | 50.73(a)(2)(iv) | | OTHER |
| | 20.2203(a)(2)(iii) | | 50.36(c)(1) | | 50.73(a)(2)(v) | | Specify in Abstract below or in NRC Form 366A |
| | 20.2203(a)(2)(iv) | | 50.36(c)(2) | | 50.73(a)(2)(vii) | | |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| Michael Verrilli Sr. Analyst - Licensing | (919) 362-2303 |

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS | | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS |
|---|---|---|---|---|---|---|---|---|---|---|
| E | TL | EXC | W123 | Y | | | | | | |
| | | | | | | | | | | |

| SUPPLEMENTAL REPORT EXPECTED (14) | | | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|---|---|---|---|---|---|---|
| | YES (If yes, complete EXPECTED SUBMISSION DATE). | X NO | | | | |


ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

At approximately 0256 hours on July 20, 1997, with the plant at approximately 100% power in mode 1, a Turbine Trip/Reactor Trip occurred due to a generator lock-out resulting from loss of the main generator excitation field. As a result of the trip, the Auxiliary Feedwater (AFW) System automatically started as required to provide feedwater flow to the Steam Generators (S/G). Operators in the main control room immediately implemented Emergency Operating Procedure (EOP Path-1) and upon verification that a safety injection was not required and had not occurred, entered the Reactor Trip Response procedure (EOP-EPP-004) to stabilize the plant. Approximately 5 minutes after the plant trip, AFW flow to the S/Gs was secured in order to return Reactor Coolant System (RCS) temperature back to 557 degrees (RCS temperature reached approximately 548 degrees during AFW operation). Various plant components not required for plant recovery were observed tripped in the main control room due to the electrical transient involved in the plant trip. Automatic protection and safeguards systems functioned as required and the plant was stabilized in mode 3 (Hot Standby).

The cause of the Turbine Trip/Reactor trip was a three phase fault that collapsed the excitation field in the main generator, resulting in a generator lockout. Investigation could not conclusively determine the reason for the electrical fault in the generator exciter. However, the most probable cause appears to be entry of foreign material into the exciter housing that caused multiple shorts on the exciter diode wheel.

Corrective actions for this event included replacement of the exciter rotor assembly and inspections to ensure no foreign material was present in the exciter and exciter housing area. Additional actions will include strengthening the plant's Foreign Material Exclusion Program with regards to the Generator Exciter. This will be performed via a revision to Maintenance Procedure, PM-E0045 "Generator Exciter Cleaning, Inspection, and Testing" to specify cleanliness close-out requirements for the Generator Exciter.

# LICENSEE EVENT REPORT (LER)

TEXT CONTINUATION

| FACILITY NAME (1) | DOCKET | LER NUMBER (6) | | | PAGE (3) |
|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Shearon Harris Nuclear Plant - Unit #1 | 50-400 | 97 | -- 019 -- | 00 | 2 OF 2 |

TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

## EVENT DESCRIPTION:

At approximately 0256 hours on July 20, 1997, with the plant at approximately 100% power in mode 1, a Turbine Trip/Reactor Trip occurred due to a generator lock-out resulting from loss of the main generator excitation field. As a result of the trip, the Auxiliary Feedwater (AFW) System automatically started as required to provide feedwater flow to the Steam Generators (S/G). Operators in the main control room immediately implemented Emergency Operating Procedure (EOP Path-1) and upon verification that a safety injection was not required and had not occurred, entered the Reactor Trip Response procedure (EOP-EPP-004) to stabilize the plant. Approximately 5 minutes after the plant trip, AFW flow to the S/Gs was secured in order to return Reactor Coolant System (RCS) temperature back to 557 degrees (RCS temperature reached approximately 548 degrees during AFW operation). Various plant components were observed tripped in the main control room due to the electrical transient involved in the plant trip. Automatic protection and safeguards systems functioned as required and the plant was stabilized in mode 3 (Hot Standby).

## CAUSE:

The cause of the Turbine Trip/Reactor trip was a three phase fault that collapsed the excitation field in the main generator, resulting in a generator lockout. Investigation could not conclusively determine the reason for the electrical fault in the generator exciter. However, the most probable cause appears to be entry of foreign material into the exciter housing that caused multiple shorts on the exciter diode wheel.

## SAFETY SIGNIFICANCE:

There were no actual safety consequences associated with this event. Automatic protection and safeguards systems functioned as required following the trip. Plant parameters such as primary temperature, pressure and S/G level were restored to normal and the plant was stabilized in mode 3 (Hot Standby).

This condition is being reported per 10CFR50.73.a.2.iv as an unplanned Engineered Safety Feature/Reactor Protection System Actuation.

## PREVIOUS SIMILAR EVENTS:

There have been no previous Turbine Trip/Reactor Trip events caused by an electrical failure in the Main Generator Exciter.

## CORRECTIVE ACTIONS COMPLETED:

1. The exciter rotor assembly was replaced and inspections were performed to ensure no foreign material present in the exciter and exciter housing area.

## CORRECTIVE ACTIONS PLANNED:

1. The plant's Foreign Material Exclusion (FME) Program will be strengthened with regards to the main generator exciter. This will be performed via a revision to Maintenance Procedure, PM-E0045 "Generator Exciter Cleaning, Inspection, and Testing" to specify cleanliness close-out requirements for the generator exciter. This will be completed by December 19, 1997.